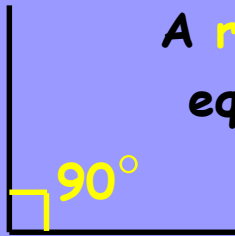
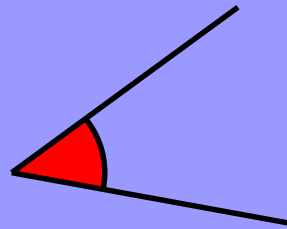


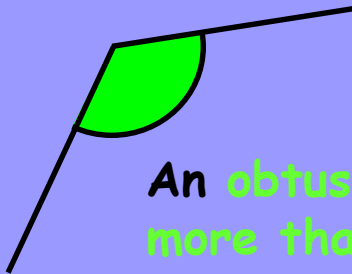
Types of Angles



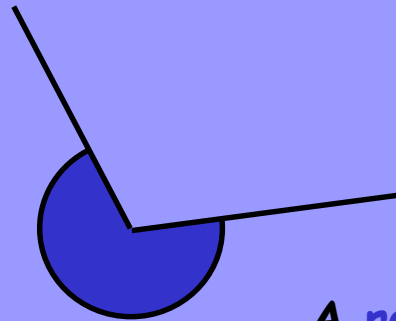
A **right** angle
equals **90°**



An **acute** angle
is **less than 90°**

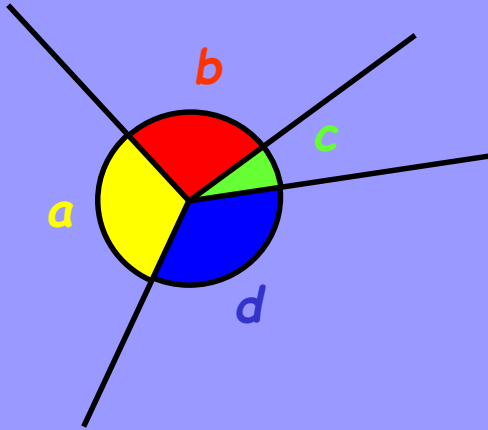


An **obtuse** angle is
more than 90° but
less than 180°



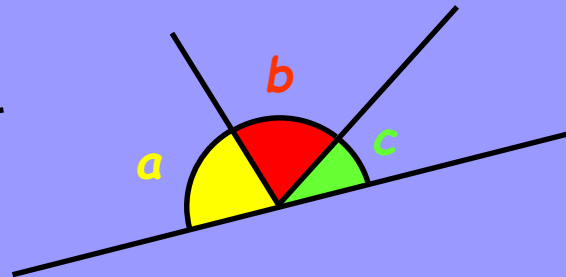
A **reflex** angle is
more than 180°

Angle Properties



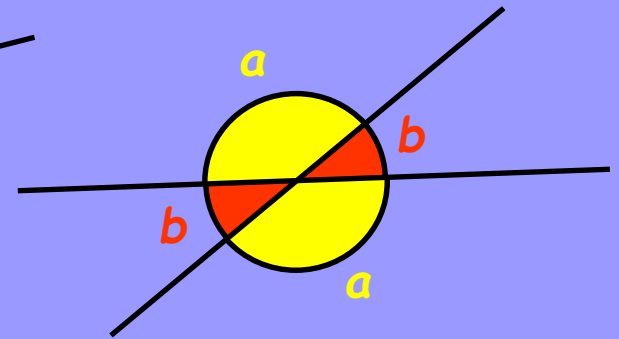
Angles at a point
add to 360°

$$a + b + c + d = 360^\circ$$



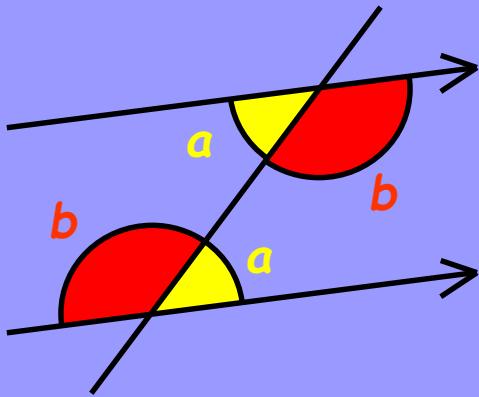
Angles on a straight
line add to 180° .

$$a + b + c = 180^\circ$$

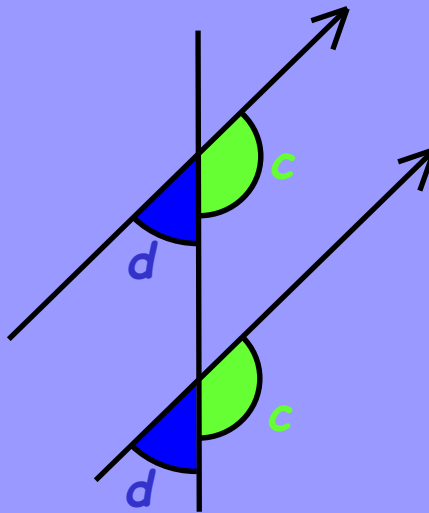


Vertically opposite
angles are equal.

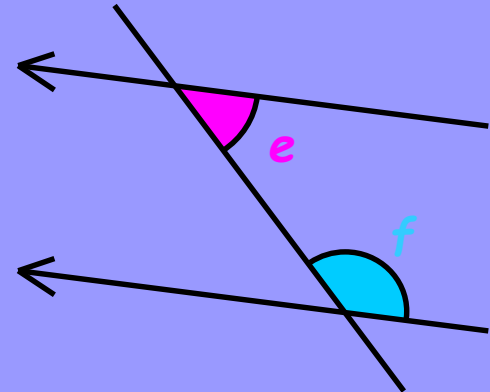
Parallel Lines



Alternate angles
are equal.



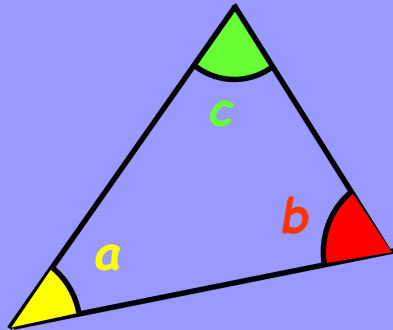
Corresponding angles
are equal.



Interior angles
add to 180° .

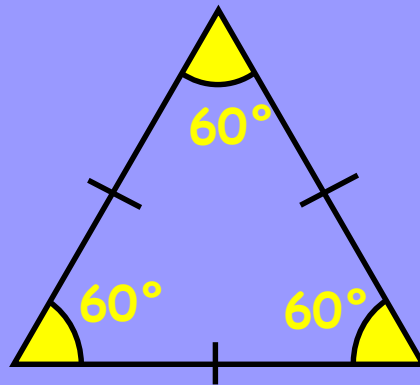
$$e + f = 180^\circ$$

Triangles

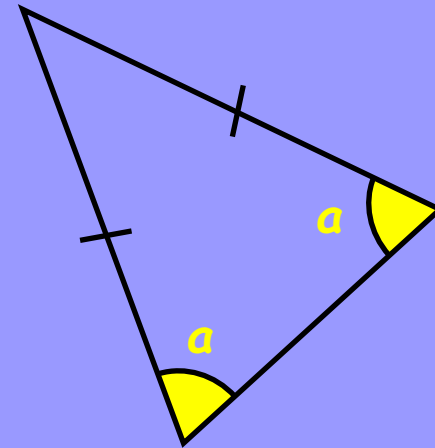


The sum of the angles of a triangle is 180°

$$a + b + c = 180^\circ$$

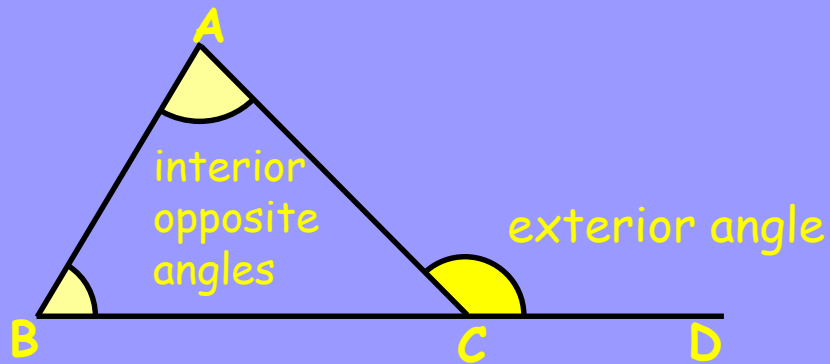


Equilateral triangles have 3 equal sides and 3 equal angles.



Isosceles triangles have 2 equal sides and 2 equal angles.

Exterior angles of a triangle



The exterior angle of a triangle is equal to the sum of the interior opposite angles.

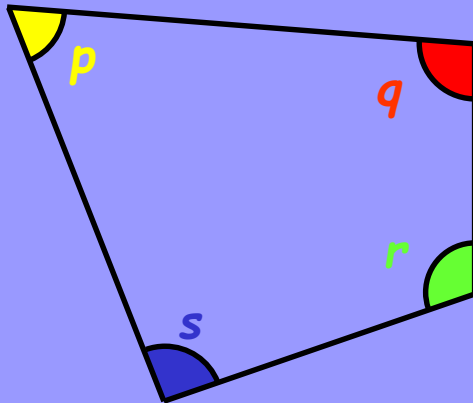
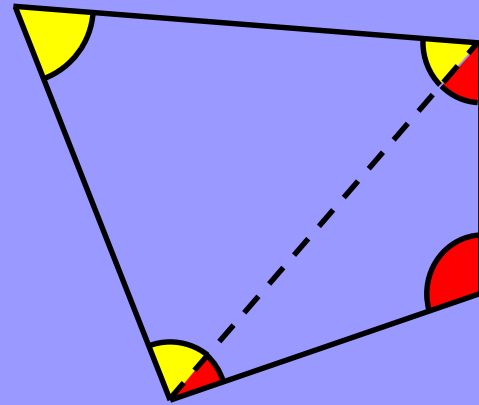
i.e. $\angle ACD = \angle ABC + \angle BAC$

Quadrilaterals

A **quadrilateral** has 4 sides.

It can be split into 2 triangles.

The sum of the angles of a quadrilateral = $2 \times 180^\circ = 360^\circ$.



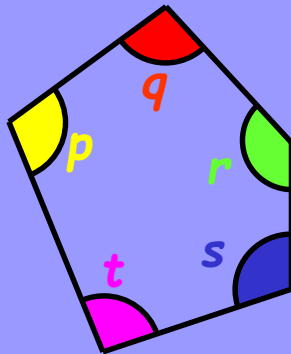
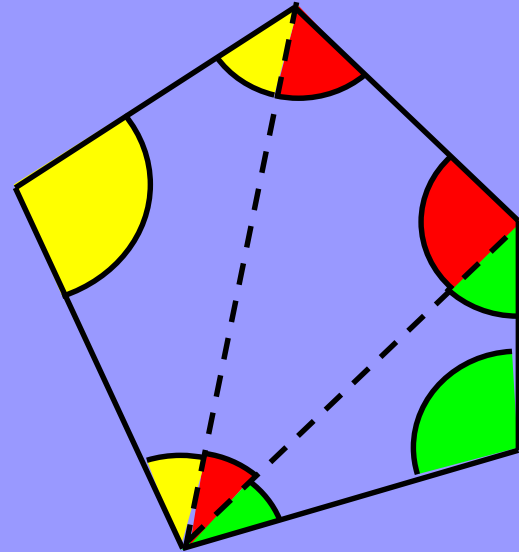
$$p + q + r + s = 360^\circ$$

Interior angles of polygons

A **pentagon** has **5** sides.

It can be split into 3 triangles.

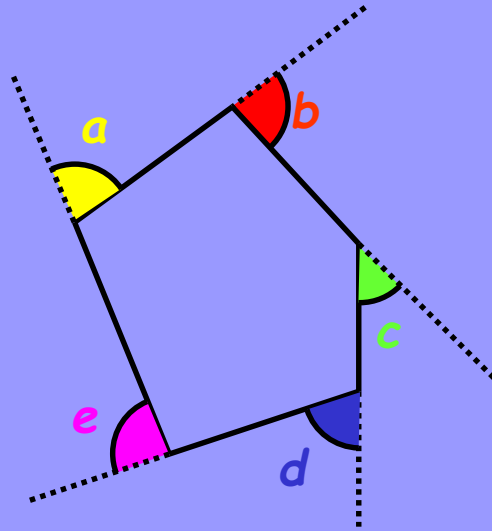
The sum of the **interior** angles of any pentagon = $3 \times 180^\circ = 540^\circ$



$$p + q + r + s + t = 540^\circ$$

Interior angles of a polygon with n sides add to $(n - 2)180^\circ$.

Exterior angles of a polygon



Exterior angles of a polygon add to 360° .

$$a + b + c + d + e = 360^\circ$$

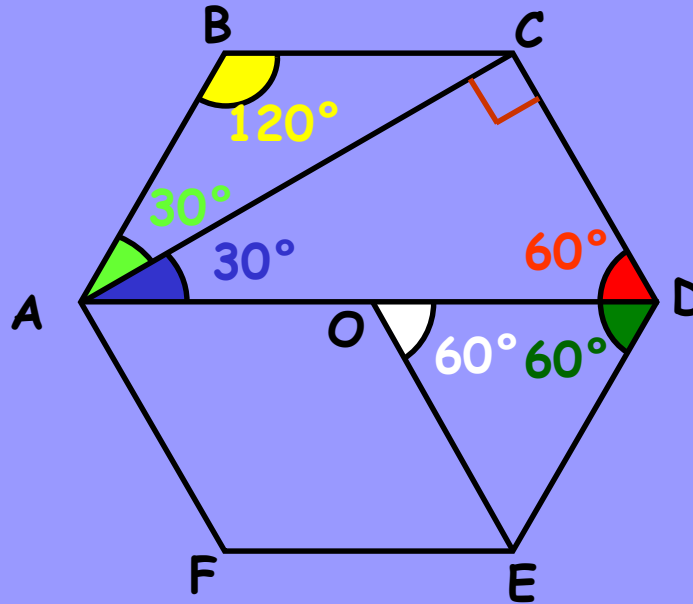
At each vertex: interior angle + exterior angle = 180°

Regular Polygons

No. of sides	Name	Angle Sum	Interior Angle
3	triangle	180°	60°
4	quadrilateral	360°	90°
5	pentagon	540°	108°
6	hexagon	720°	120°
7	heptagon	900°	129°
8	octagon	1080°	135°
9	nonagon	1260°	140°
10	decagon	1440°	144°

What is the **exterior angle** of each regular polygon?
Is the **total 360°** in each case?

Example



ABCDE is a regular hexagon with centre O .

Find $\angle ABC = 120^\circ$

$\angle ACD = 90^\circ$

$\angle ADC = 60^\circ$

$\angle ODE = 60^\circ$

$\angle BAC = 30^\circ$

$\angle EOD = 60^\circ$

$\angle CAD = 30^\circ$